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# Chapter 1: Overview

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## Application Module and IPE Module

The Application Module (AM) is a subunit that fits into an Application Equipment Module (AEM). It is an auxiliary application processor that provides an interface between the AEM and the Meridian 1, and possibly also a host computer, depending on the particular application running. The interface between the Application Module and the Meridian 1 is the Application Module Link (AML). The AML may also be referred to as a Command and Status Link (CSL) in the Meridian 1.

The Intelligent Peripheral Equipment (IPE) Module is a subunit that fits into an IPE shelf or Option 11 cabinet. The IPE Module also uses the AML as the interface to the Meridian 1 system.

Diagnostic tools are provided on both the Meridian 1 and the Application Module or IPE Module sides of the link. Tools on the Meridian 1 are typically the X11 input/output programs (Loads or LDs). Tools on the Application Module or IPE Module include commands and utilities accessed through the system console, or a terminal attached through a modem port or a TTY port (if available).

If you configure the optional conshare capability available to the Application Module and IPE Module, you can also access the Meridian 1 from the Application Module or IPE Module system console.

## Customer Controlled Routing

The Customer Controlled Routing (CCR) application provides a scripting interface, through which you can control the handling and treatment for calls that come through the Meridian 1 system.

You can install either the large version of CCR or the small version but not both versions. Small CCR supports twenty active script associations at most; Large CCR supports as many as 240 active associations.

## Meridian Link

The Meridian Link application is a communications facility between a host computer and a Meridian 1 system. Optionally, the Meridian Link application also provides an interface between the Meridian 1 system and Meridian Mail for voice processing.

## Meridian 1 utilities

You can use the X11 input/output programs listed below for configuring and maintaining the Application Module Link (AML). You can also use the programs for configuring telephones, Automatic Call Distribution (ACD), routes, and trunks.

For basic application configuration, see the *Meridian Link/Customer Controlled Routing Installation and Upgrade Guide* (NTP 553-3202-210). Further information can be found in the *X11 Input/Output Guide* (NTP 553-3001-400).

- LD2: Traffic report control program
- LD10: Single-line telephone administration; it configures 500/2500-type telephones
- LD11: Multiline telephone administration; it configures multiline and digital telephones
- LD14: Trunk administration; it configures trunks
- LD15: Customer data block; it configures customer-wide options
- LD16: Trunk routes; it configures routes
- LD17: Configuration record; it configures the ESDI or MSDL port between the Application Module or IPE Module and the Meridian 1
- LD20: Print program; it displays telephone configurations
- LD21: Print program; it displays the Customer Data Block configuration
- LD22: Print program; it displays the ESDI or MSDL port configuration and the Meridian 1 software packages equipped on the system
- LD23: Automatic Call Distribution (ACD); it configures ACD groups
- LD48: Link Diagnostic; it controls the status of the Application Module Link (AML) from the Meridian 1 and monitors AML messages flowing in and out of the Meridian 1

## Application Module hardware components

The Single Board Computer (SBC) card can be either an MVME147SA-1 or an MVME167-03. For easier reading, this card will be referred to as the MVME147/167 card.

The hardware components listed below (see Figures 1 and 2) are field-replaceable units.

- **MVME147SA-1 SBC card**  
This is the main CPU card of the Application Module. There are four LEDs and two switches on the faceplate of the SBC card:
  - The red LED (Fail indicator) is lit when the BRDFAIL bit is set or when a watchdog time-out occurs. It is normal for this indicator to flicker while diagnostics are running; when a failure occurs, this indicator is steadily lit.
  - The yellow LED (Status indicator) is lit when the MC68030 STATUS pin is low (when steadily lit, it indicates that the processor has stopped).
  - The green LED (Run indicator) is lit when the microprocessor executes a bus cycle.
  - The green LED (SCON indicator) is lit to indicate that the SBC card is the VME bus system controller.
  - The ABORT switch stops program execution and returns control to the debugger.
  - The RESET switch, when enabled, generates a local reset. If the SBC card is the system controller, this switch also generates a VME bus system reset.



### **CAUTION** **Risk of data loss**

Do not press the ABORT and RESET switches at the same time unless directly instructed by Nortel support personnel. You risk losing device configuration information.

- **MVME167-03 SBC card**  
The main CPU card of the Application Module. There are eight LEDs and two switches on the faceplate of the SBC card:
  - The red LED (Fail indicator) is lit when the BRDFAIL bit is set or when a watchdog time-out occurs. It is normal for this indicator to flicker while diagnostics are running; when a failure occurs, this indicator is steadily lit.
  - The yellow LED (Status indicator) is lit when the MC68040 STATUS pin is low (when steadily lit, it indicates that the processor has stopped).
  - The green LED (Run indicator) is lit when the microprocessor executes a bus cycle.
  - The green LED (SCON indicator) is lit to indicate that the SBC card is the VME bus system controller.
  - The green LED (LAN indicator) is lit when the LAN chip is the local bus master.
  - The green LED (+12V indicator) is lit when power is available to the transceiver interface.
  - The green LED (SCSI indicator) is lit when the SCSI chip is the local bus master.
  - The green LED (VME indicator) is lit when the board is using the VME bus, or when the board is accessed by the VME bus.

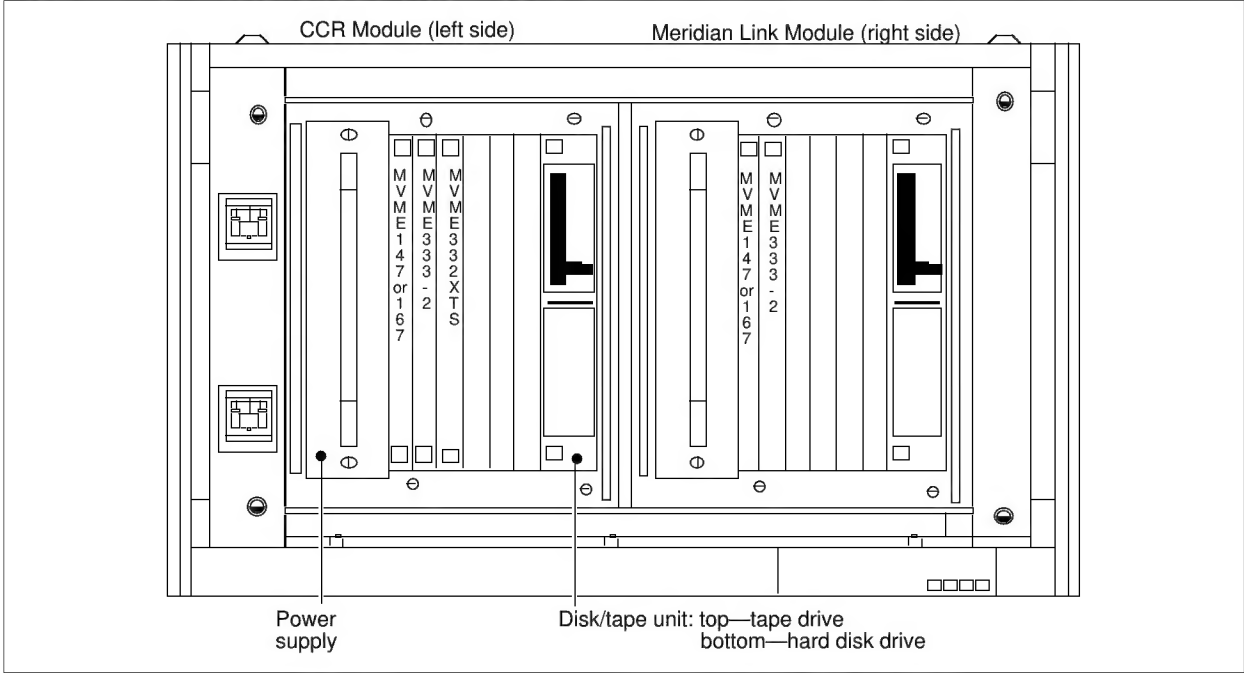
- The ABORT switch stops program execution and returns control to the debugger.
- The RESET switch, when enabled, generates a local reset. This switch also generates a VME bus system reset.
- MVME333-2 X.25 Communication Controller (XCC) card  
This card supports synchronous communications links to a host computer and the Meridian 1. On the faceplate, there is a single red LED (Fail indicator), which lights when a hardware or LAPB/X.25 communication software error occurs.

- **MVME332XTS Asynchronous Communication Controller (ACC) card**  
This card provides eight RS-232 interface ports for connection of terminals and printers. There are three LEDs on the faceplate of the ACC card:
  - The red LED (Fail indicator) lights when a hardware failure occurs on the ACC card.
  - The red LED (Halt indicator) lights steadily when the on-board processor halts, indicating an ACC card malfunction.
  - The green LED (Run) indicates the activity level of the ACC card by lighting dimly, brightly, or in pulsing mode. A dimly lit LED indicates that the system is idle, meaning that no terminal activities are occurring. A brightly lit or pulsing LED indicates data transfer activities are taking place.
- **MVME712A and MVME712AM transition cards**  
The MVME712A and MVME712AM cards provide four 9-pin connectors (asynchronous serial ports 1–4) and a printer-port connector. Additionally, the MVME712AM card provides an RJ11 port.  
  
The MVME712AM card has a built-in modem and is used in countries in which the modem is type-approved. The MVME712A transition card, which does not provide a built-in modem, uses a locally-approved external modem for remote maintenance.  
  
The built-in modem in the MVME712AM card provides full duplex operation over two-wire Public Switch Telephone Networks (PSTNs). It operates in asynchronous mode at data rates of 300, 600, 1200, or 2400 bps.  
  
This transition card also provides an Ethernet connection.
- **MVME712M transition card**  
This card supports RS-232 ports and Ethernet and SCSI interfaces for the SBC card.

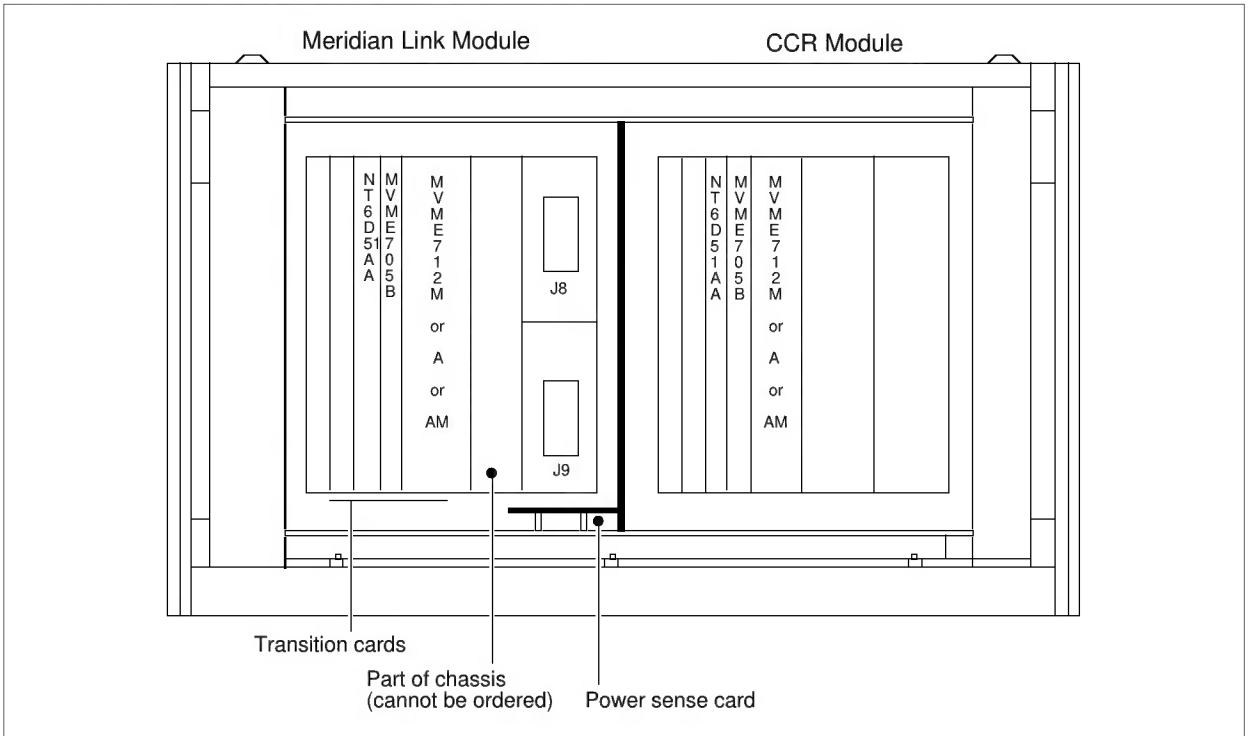
- MVME705B transition card  
This card supports two synchronous I/O ports for the MVME333-2 XCC card. SP1 connects the Application Module Link (AML) to the Meridian 1.
- NT6D51AA transition card  
This card supports eight serial I/O ports for the MVME332XTS ACC card. SP1 connects to ports 1, 2, and 3; SP2 connects to ports 4, 5, and 6; and SP3 connects to ports 7 and 8.
- Power supply  
This is located at the front left-side of the Application Module.
- Disk/tape unit  
This is located at the front right-side of the Application Module. This unit contains a hard disk drive and a cassette tape drive.

The entire Application Module is also field-replaceable. If, in diagnosing the problem, replacing the above components does not help, contact your Nortel support personnel.

**Figure 1**  
**Application Module in the AEM—front view**



**Figure 2**  
**Application Module in the AEM—rear view**



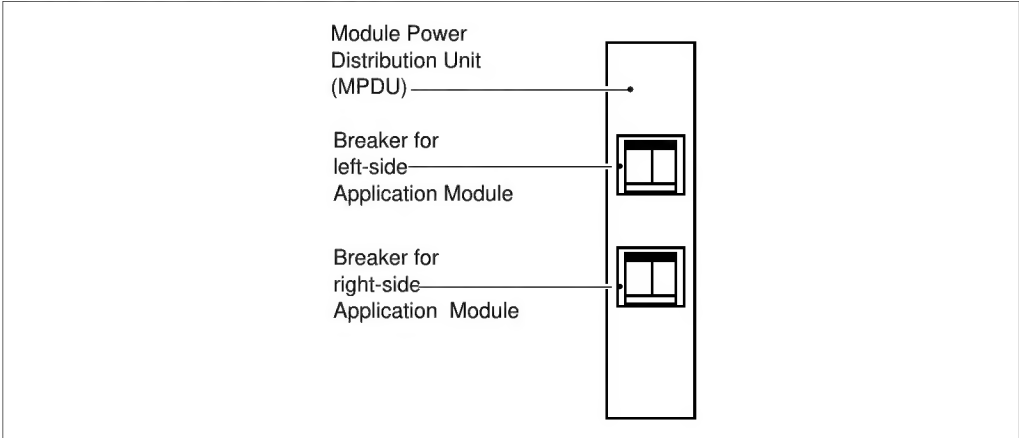


**CAUTION**  
**Risk of system damage**

If you want to remove a card, you must perform the required software and hardware power-down processes. Hardware can be damaged if a component is reseated on the VME bus (Versa Module Eurocard bus) while the power is on. The operating system can be corrupted if the power switch is turned off before the application performs a normal shutdown.

The module power distribution unit (MPDU) in each AEM provides a circuit breaker for each Application Module in the AEM so you can power down components in one module without affecting the other (see Figure 3).

Figure 3  
MPDU circuit breaker associations





## IPE Module hardware components

The IPE Module contains an SMM167 single board computer (SBC) card, a 240-Mbyte disk drive, a 600-Mbyte tape drive, and an IPE adapter card. Only the IPE Module is field-replaceable.

### SMM167

This card, one of the Motorola MVME167 family, consists of the following:

- MC68040 microprocessor operating at 25 MHz
- 8 Mbytes of dynamic random access memory (DRAM)
- MC68882 floating point coprocessor
- shared dynamic random access memory (DRAM) with parity
- time-of-day clock and calendar with battery backup
- 128 kbyte of static random access memory (SRAM)

The SBC card provides the following interfaces:

- Small Computer Systems Interface (SCSI) bus interface with direct memory access (DMA) channel to control the disk/tape unit
- eight serial I/O ports with EIA-232-D buffers
- Ethernet transceiver interface

### IPE Module faceplate

The IPE Module faceplate contains a Small Computer System Interface (SCSI) connector, four light-emitting diodes (LEDs), and three switches.

The SCSI connector must contain an SCSI terminator.

The LEDs show the following conditions:

- PWR indicator: This green LED is lit when the power is turned on.
- Run indicator: This yellow LED is lit almost continuously when an application is running, but flickers every few seconds.

- SCSI indicator: This yellow LED is lit almost continuously when in use. The intensity varies according to the amount of data movement.
- Fail indicator: This red LED is lit when a hardware or software failure occurs on the SBC card.

The switches perform the following functions:

- Power pushbutton: This turns power on and off on the IPE Module.
- ABORT button: This button, when pressed, stops program execution and returns control to the debugger. *Do not press this button.* If you accidentally press it, all software operations will stop and you will be in the firmware debugger. In this case, press the red RESET button immediately to reboot the system. Software diagnostics during system boot will attempt to repair possible file system damage caused by the non-standard shutdown.
- RESET button: This button invokes a cold restart. The system performs a self test and then reboots. *Do not press* the button while an application is running. Exit the application and prepare the system for powering down before pressing the RESET button. If the SBC card is the system controller, this button also generates a VME bus system reset. The software power down procedure is provided in Chapter 8, “Recovery/replacement procedures.”



**CAUTION**  
**Risk of memory loss**

Do not press both the ABORT and RESET buttons at the same time—you risk losing device configuration information.

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## **Tape drive**

The tape drive is a 600-Mbyte cassette tape drive. The tape drive cannot be replaced in the field.

The following tapes are supplied with the IPE Module:

- a 155-Mbyte tape that provides the operating system for the IPE Module
- a 155-Mbyte tape that provides the application software

## **Disk drive**

The disk drive is a 240-Mbyte drive. The disk drive cannot be replaced in the field.

## **I/O connectors**

The I/O connectors for the IPE Module installed in an Option 11 system are standard, shielded, 50-pin tip-ring-type connector ports on the connector panel, which is located under the cabinet containing the module. The I/O connectors for an IPE Module installed in an Options 21–81 system are also standard, shielded 50-pin connector ports, which are located on the two I/O panels.

# Application Module and IPE Module utilities

You access applications software by logging in as one of the following:

**ccrusr**

Use this login to perform CCR functions, such as profile and script management.

**maint**

Use this login to perform generic functions (such as start/stop applications, tape backup/restore, password administration), and to prepare the system for a power down or reset.

**mlusr**

Use this login to perform link-specific functions for the AML. Such functions include link configuration, control, trace, and statistics.

**trmcnfg**

Use this login to set up a personal computer that is running Reflection 4+ software.

## Logging in

When presented with the login prompt (“Console Login:”) at the system console, enter the appropriate user type (maint, for example) followed by the password for that user type (the default password is the same as the user name).

For example, to log in as maint, enter the following responses. Press [Return] to indicate your entry.

```
Console Login: maint
Password: maint
maint>
```

The prompt you see indicates the user type you used to log in; for example, logging in as maint produces a “maint>” prompt.

To log out, type **exit** or **quit** and press [Return]. For example:

```
maint> exit
Console Login:
```

## The ccrusr function

You can reach the ccrusr function from within maint using the ccrusr command, or by logging in as ccrusr at the “Console login:” prompt. The function allows you to do the following (depending on your access privilege):

- maintain user profiles and define access privileges
- create, edit, and view scripts
- create and display CDNs associated with a script
- create and display names or terms representing values

## The maint function

The system administrator uses the maint user ID for the following:

- system shutdown in preparation for power down or reset
- tape backup/restore facilities
- system operations/administration (log file and password management)
- general maintenance (disk usage)

When you log in as maint, you see the “maint>” prompt. To terminate the session and return to the “Console Login:” prompt, type **exit** or **quit**, and press [Return]. Type **help** and press [Return] to see a list of Application Module commands available to a maintenance user.

## The mlusr function

You can reach the mlusr function from within maint using the mlusr or admin command, or by logging in as mlusr at the “Console Login:” prompt. The function provides a suite of administrative facilities specific to the Application Module Link (AML) software running on the Application Module or IPE Module. You can use this function to display, change, and configure link 0 (the AML), and also link 1 (the Host Link) and link 2 (Meridian Mail Link), if present. The commands related to management of link include the following:

**Table 1**  
**AML administration commands**

| Commands        | Description                                     |
|-----------------|-------------------------------------------------|
| display linkctl | display the link control image                  |
| read link       | read a link configuration file                  |
| save link       | save a link configuration image to a named file |
| display link    | display link configuration                      |
| change link     | alter a link configuration                      |
| enable link     | enable a link                                   |
| disable link    | disable a link                                  |
| status link     | print the current status of link                |
| statistics link | print statistics for a specific link            |

The mlusr function offers help facilities to assist you. To use the help facility, type **help** (or **help+command** when you need help on a particular command) and press [Return].

**The trmcnfg function**

You use the trmcnfg function to download configuration information from a PC using Reflection 4+ software to the Application Module or IPE Module. For more information, refer to the *Meridian Link/Customer Controlled Routing Installation and Upgrade Guide* (NTP 553-3202-210).

**Advanced maintenance**

Technical users may require access to advanced diagnostic capabilities from time to time. These tools are described in the *Application Module and Intelligent Peripheral Equipment Module Advanced Maintenance Guide* (NTP 553-3211-512).